FIG. 1 Prior Art: OFDMA waveform

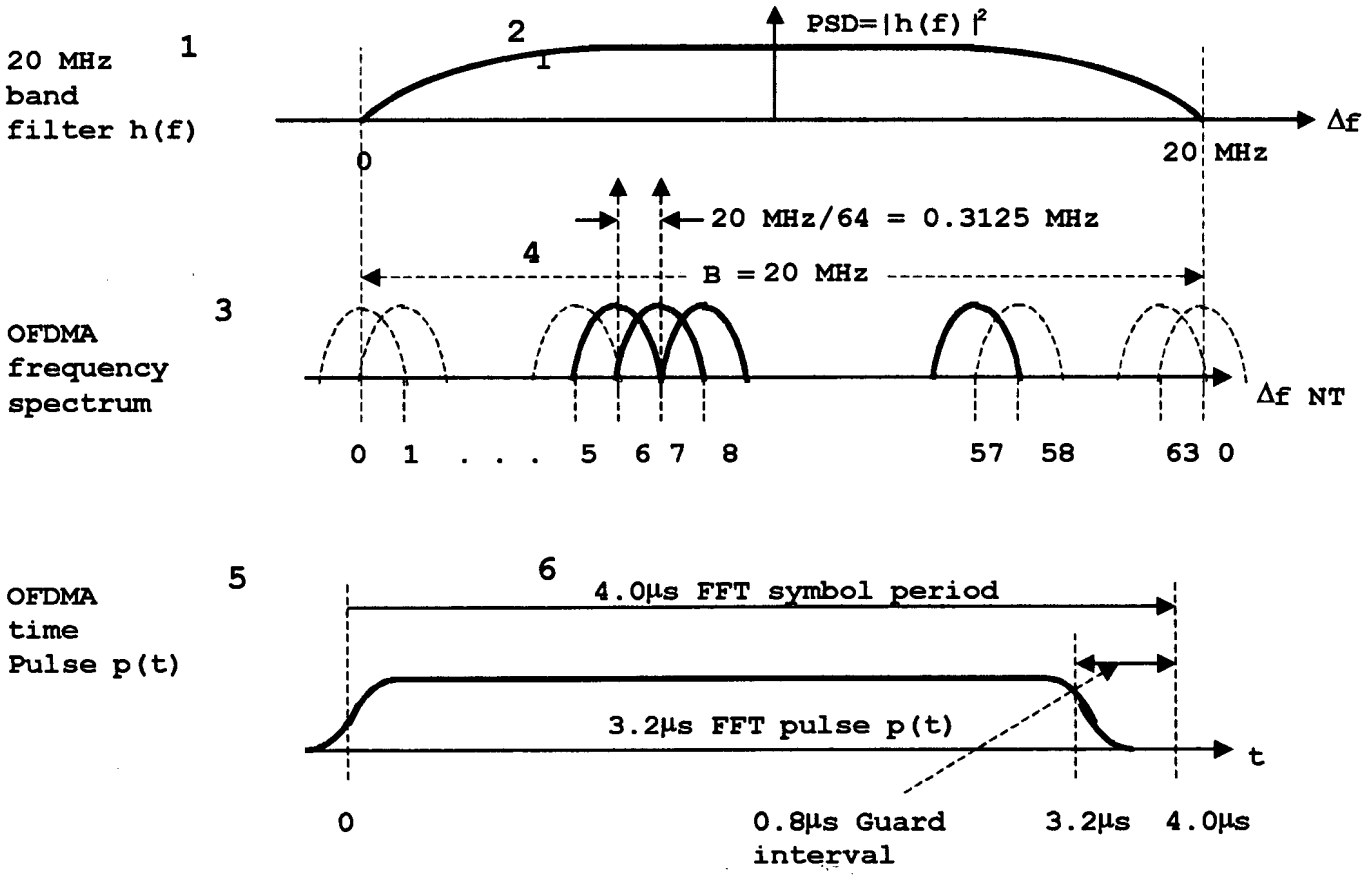


FIG. 2 Prior Art: CDMA waveform

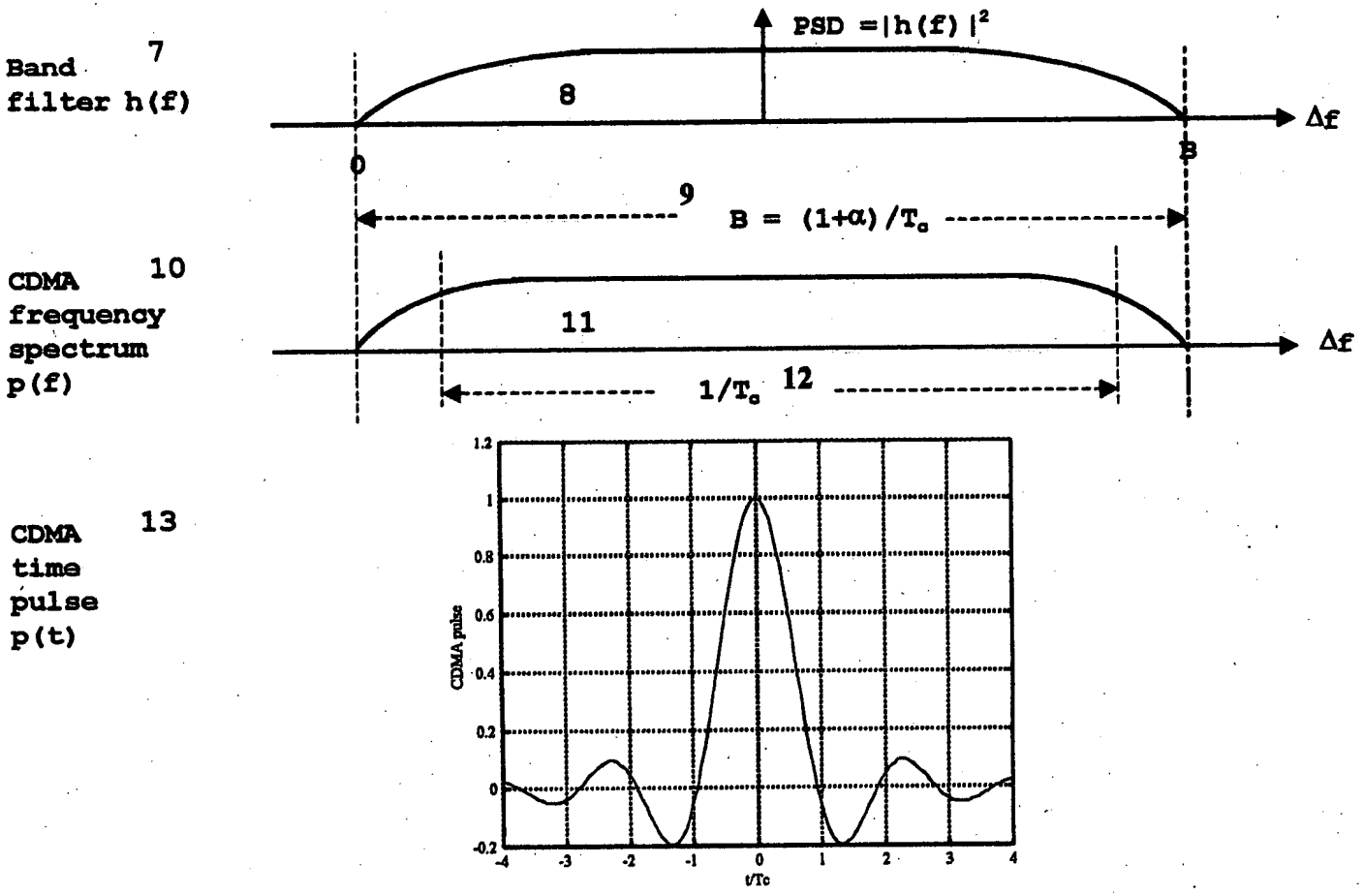
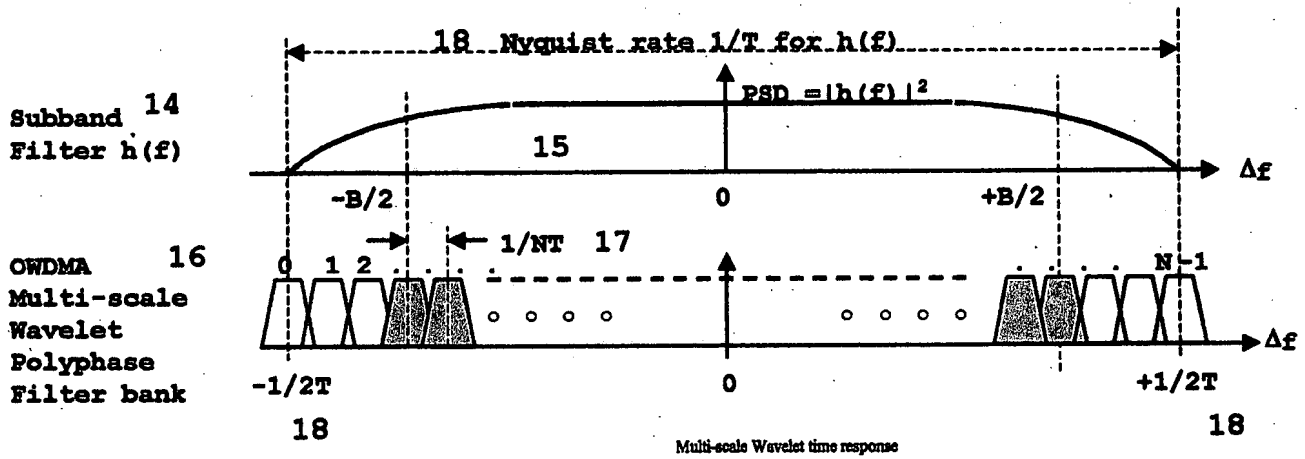
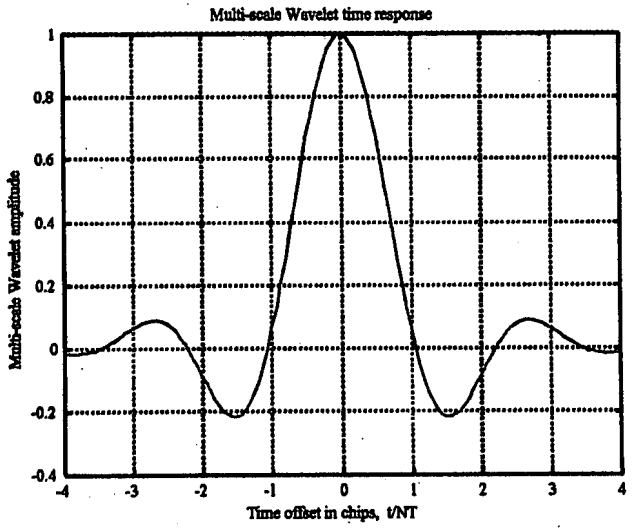


FIG. 3 OWDMA waveform





OWDMA Multi-scale Wavelet Ψ(t) 19

FIG. 4 Wavelet PSD=$|\Psi(f)|^2$ requirements for communications

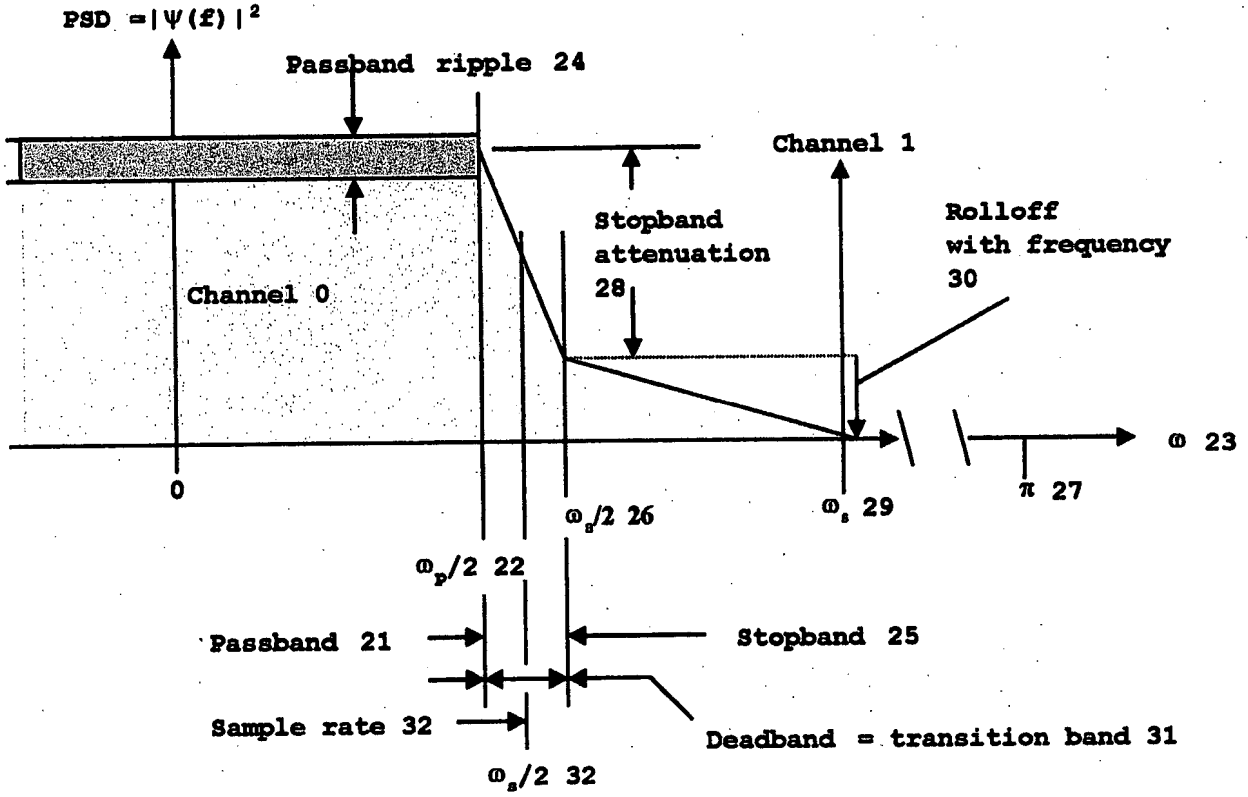


FIG. 5 PSD for New Waveform (Wavelet waveform) and Square-Root Raised Cosine (Sq-Rt R-C)

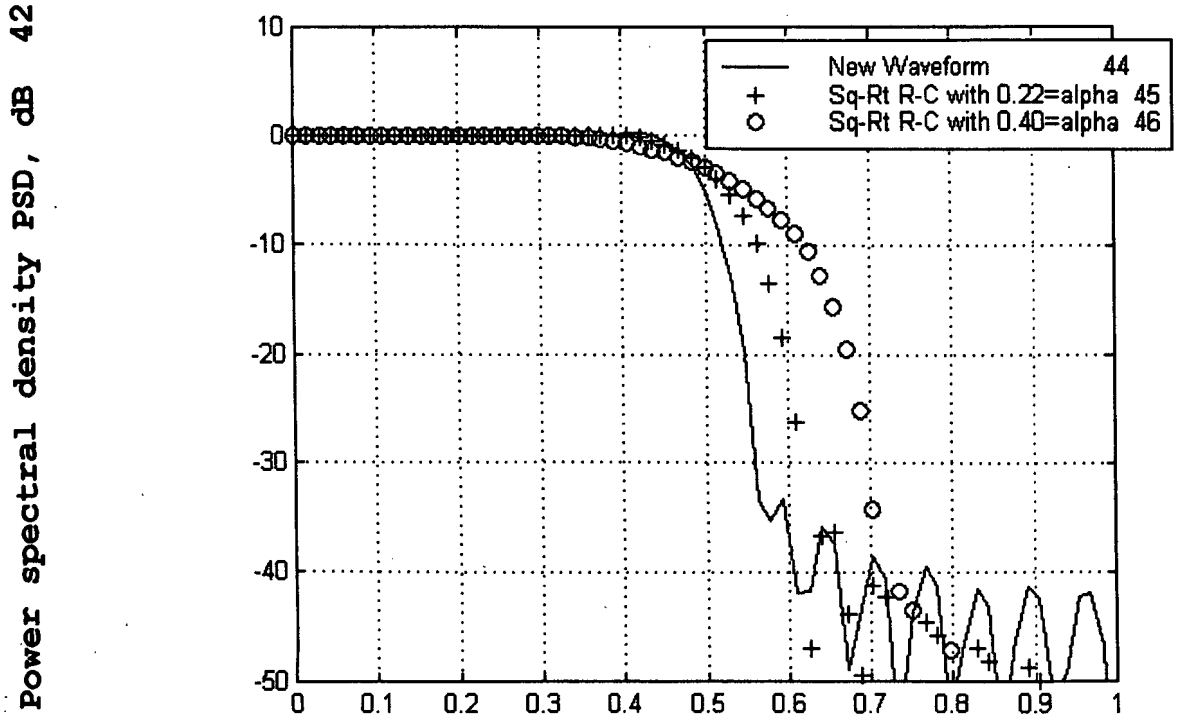


FIG. 6 MS-CDMA OFDMA/OWDMA Encoding for Transmitter

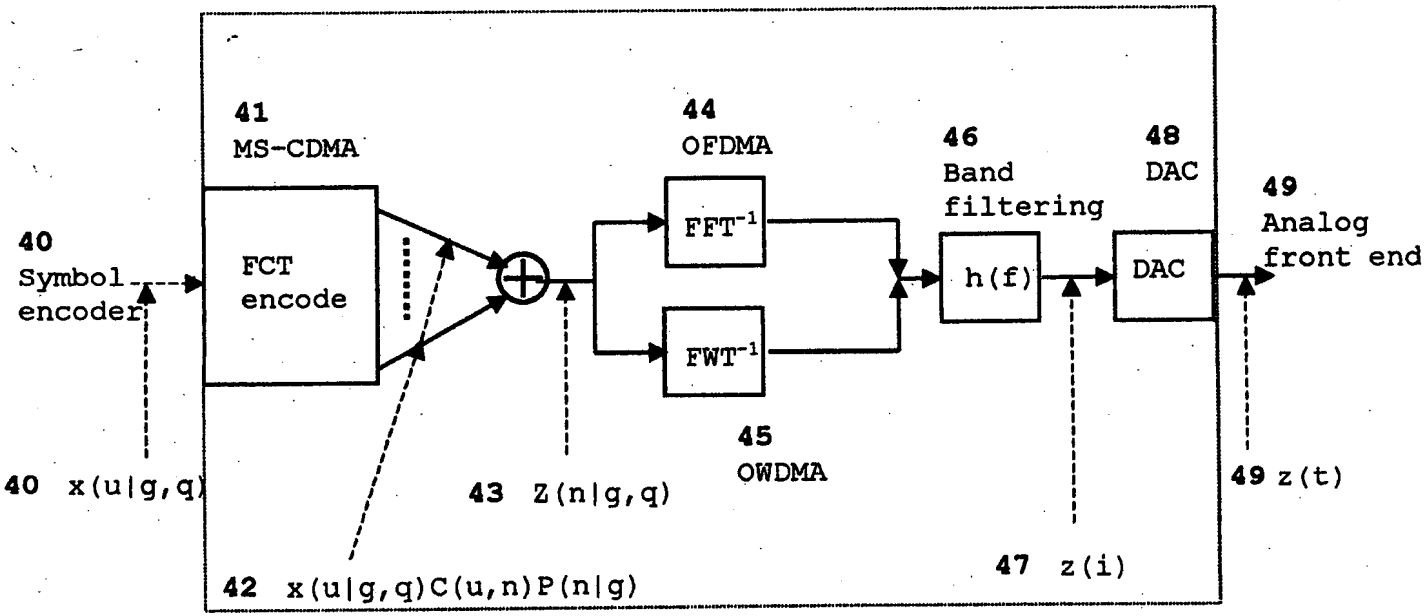


FIG. 7A MS-CDMA OFDMA/OWDMA Transmitter: Block Diagram

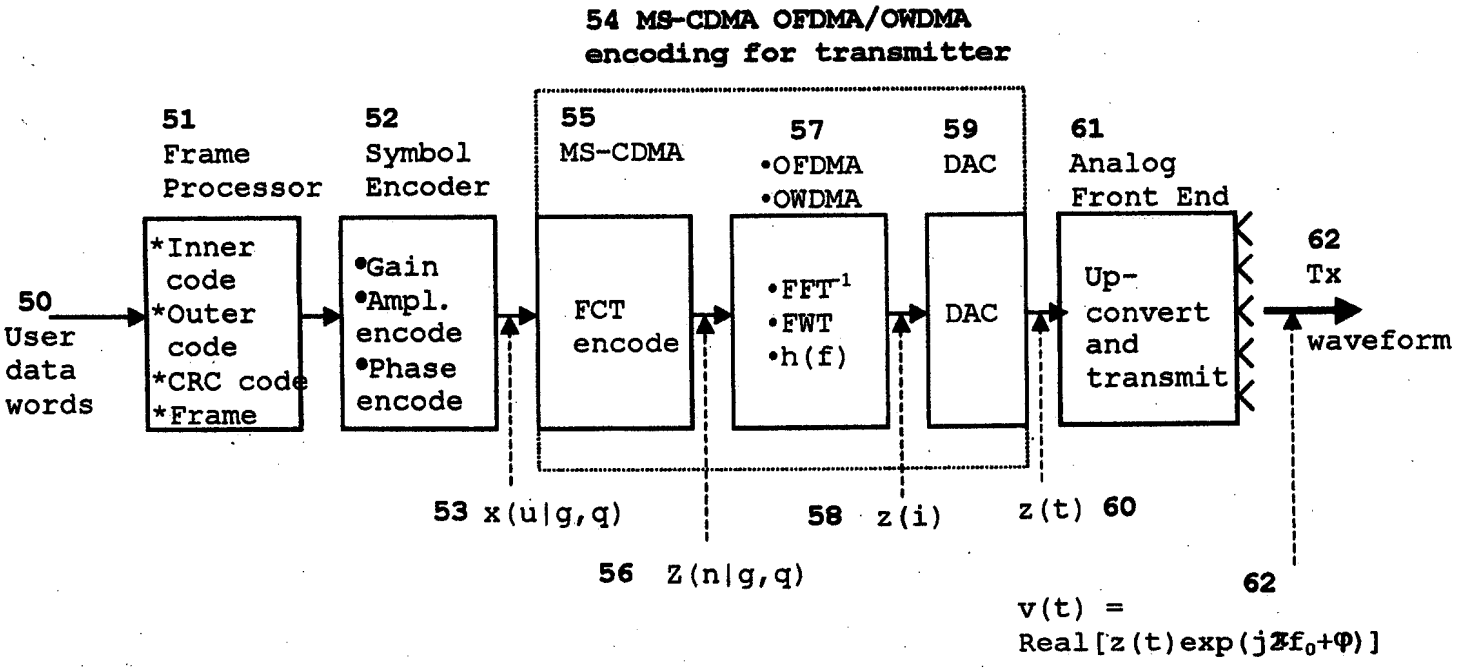


FIG. 7B MS-CDMA OFDMA/OWDMA Transmitter: MS-CDMA Mapping

MS-Mapping Example

150

n_0=0,1,2,. . .,N_0-1 over chips within each channel

n_1 =0,1,2,. . .,N_1-1 over subbands within frequency band

n_2 =0,1,2,. . .,N_2-1 over frequency bands

n_3 =0,1,2,. . .,N_3-1 over data blocks

n_4 =0,1,2,. . .,N_4-1 over beams of transmit antenna

n_5 =0,1,2,. . .,N_5-1 over transmit antennas

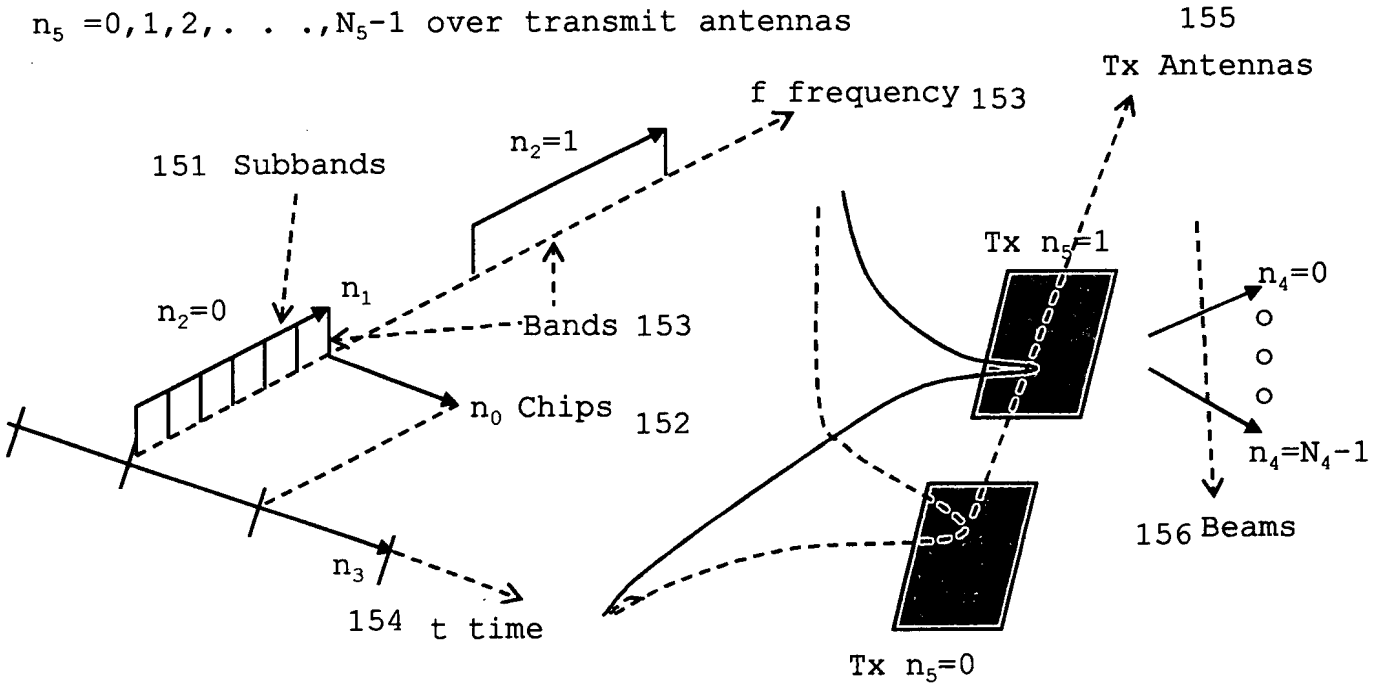


FIG. 8 MS-CDMA OFDMA/OWDMA Decoding for Receiver

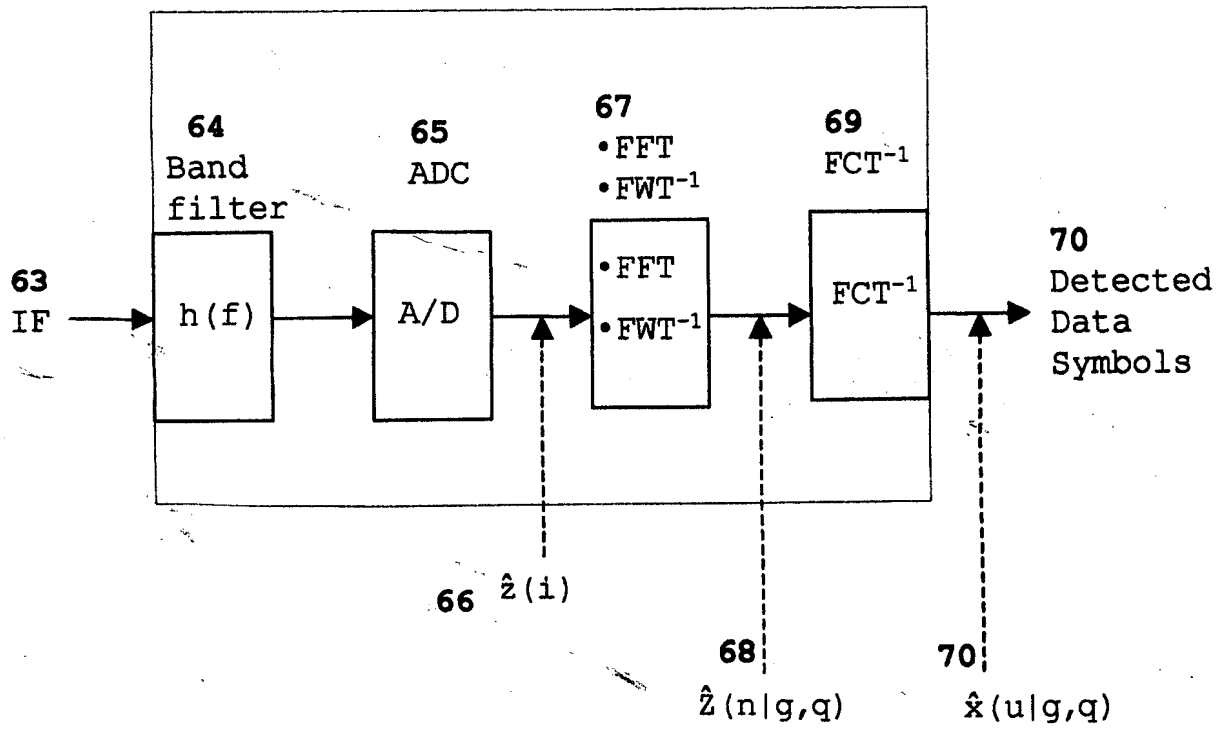


FIG. 9 MS-CDMA OFDMA/OWDMA Receiver Block Diagram